



US006089701A

United States Patent

[19]

Hashizume et al.

[11] Patent Number: **6,089,701**[45] Date of Patent: **Jul. 18, 2000**[54] **INK JET RECORDING HEAD HAVING REDUCED STRESS CONCENTRATION NEAR THE BOUNDARIES OF PRESSURE GENERATING CHAMBERS**

3-65350 3/1991 Japan 347/68
 5-504740 7/1993 Japan B41J 2/16
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Apr. 10, 1996 [JP] Japan 8-088469
 Dec. 9, 1996 [JP] Japan 8-344568
 Mar. 17, 1997 [JP] Japan 9-083245

[51] **Int. Cl.⁷** B41J 2/045[52] **U.S. Cl.** 347/70[58] **Field of Search** 347/68, 70, 71, 347/72

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[57] **ABSTRACT**

An ink-jet recording head comprising: an elastic sheet providing pressure generating chambers; nozzle orifices, each communicating with the pressure generating chamber; piezoelectric vibrators formed on the elastic sheet, each of the piezoelectric vibrators having, a lower electrode formed on the elastic sheet, a piezoelectric layer formed on the lower electrode, and an upper electrode formed on the piezoelectric layer such that the upper electrode faces the respective pressure generating chamber, wherein the upper electrodes of the piezoelectric vibrators are positioned independently of each other; an electrical insulator layer having windows, wherein the electrical insulator layer covers the upper electrodes; and a conductor pattern connecting with the upper electrodes via the windows of the electrical insulator layer.

12 Claims, 7 Drawing Sheets

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